

## CLAIMS.

- 1. A method for detecting and locating a common signal within two input signals using correlation based techniques, comprising providing at least one filter by analysing the phase of the input signals in the frequency domain; filtering the input signals in the frequency domain using said at least one filter; and performing crosscorrelation of the filtered signals.
- 2. A method for detecting and locating leaks in a fluid carrying pipe using correlation based techniques, comprising: detecting two input signals from the fluid carrying pipe; analysing the phase of the input signals in the frequency domain to provide at least one filter; filtering the input signals in the frequency domain using the at least one filter; and performing crosscorrelation of the filtered signals.



- 3. A method according to claim 1 or 2, wherein the signals are audio signals.
- 4. A method according to any preceding claim, wherein the at least one filter includes a first filter for suppressing frequencies which do not exhibit a sufficient degree of coherence.
- 5. A method according to claim 4, wherein the first filter is constructed using a method comprising: selecting at least one section from each of the two input signals; calculating the Fourier Transform for each section; calculating the average vector sum of the phase difference between the two input signals

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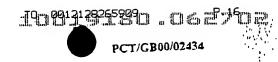
for each of a plurality of frequencies; and calculating the magnitude of the vector sum for each frequency.



- 6. A method according to any preceding claim, wherein the at least one filter includes a second filter for identifying regions in the frequency spectrum of a crosscorrelation function likely to exhibit a correlated phase between adjacent frequencies in its Fourier Transform.
- 7. A method according to claim 6, wherein the second filter is constructed using a method comprising: selecting at least one section from each of the two input signals; calculating the Founer Transform for each section; calculating the average vector sum of the phase difference hetween the two input signals for each of a plurality of frequencies; and calculating the magnitude of the vector sum for each frequency.



- 8. A method according to claim 6 or 7, including calculating the time delay between the common signal in the input signals by tracking the phase difference between the input signals as a function of frequency using the second filter.
- 9. A method according to any of claims 6 to 8, including calculating variations in the time delay between the common signal in the input signals as a function of frequency using the second filter.
- 10. A method according to any preceding claim, including using a third filter to remove frequencies which do not have sufficient amplitude.



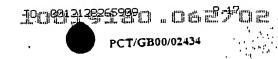
11. A method according to claim 10, wherein the third filter is constructed using a method comprising: applying a digital threshold to the product of the spectra of the two input signals.

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- 12. A method according to any preceding claim, wherein the at least one filter includes a fourth filter for compensating the input signals for dispersion effects.
- 13. Apparatus for detecting and locating a common signal within two input signals using correlation based techniques, comprising a computer including: means for providing at least one filter by analysing the phase of the input signals in the frequency domain; means for filtering the input signals in the frequency domain using said at least one filter; and means for performing crosscorrelation of the filtered signals.
- 14. Apparatus for detecting and locating leaks in a fluid carrying pipe using correlation based techniques, comprising: detectors for detecting two input signals from the fluid carrying pipe; a computer including means for analysing the phase of the input signals in the frequency domain to provide at least one filter; means for filtering the input signals in the frequency domain using the at least one filter; and means for performing crosscorrelation of the filtered signals.



15. Apparatus according to claim 13 or 14, wherein the signals are audio signals.



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- 16. Apparatus according to any of claims 13 to 15, wherein the at least one filter includes a first filter for suppressing frequencies which do not exhibit a sufficient degree of coherence.
- 17. Apparatus according to claim 16, wherein the first filter is constructed using a method comprising: selecting at least one section from each of the two input signals; calculating the Fourier Transform for each section; calculating the average vector sum of the phase difference between the two input signals for each of a plurality of frequencies; and calculating the magnitude of the vector sum for each frequency.

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- 18. An apparatus according to any of claims 13 to 17, wherein the at least one filter includes a second filter for identifying regions in the frequency spectrum of a crosscotrelation function likely to exhibit a correlated phase between adjacent frequencies in its Fourier Transform.
- 19. An apparatus according to claim 18, wherein the second filter is constructed using a method comprising: selecting at least one section from each of the two input signals; calculating the Fourier Transform for each section; calculating the average vector sum of the phase difference between the two input signals for each of a plurality of frequencies; and calculating the magnitude of the vector sum for each frequency.

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20. An apparatus according to claim 18 or 19, including calculating the time delay between the common signal in the inout signals by tracking the phase difference between the input signals as a function of frequency using the second filter.

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- 21. An apparatus according to any of claims 18 to 20, including calculating variations in the time delay between the common signal in the input signals as a function of frequency using the second filter.
- 22. Apparatus according to any of claims 13 to 21, including a third filter to remove frequencies which do not have sufficient amplitude.
- 23. Apparatus according to claim 22, wherein the third filter is constructed using a method comprising: applying a digital threshold to the product of the spectra of the two input signals.



24. Apparatus according to any of claims 13 to 23, wherein the at least one filter includes a fourth filter for compensating the input signals for dispersion effects.